

## TRANSPARENT EXTRACTION FILTER CIGARETTE

## DESCRIPTION

## [Technical Field]

The present invention relates to a filter cigarette. Particularly the  
5 present invention relates to improving a filter device for extracting the  
noxious substance of cigarette smoke, and a filter rod wrap and a tipping  
paper to enhance the product value of the cigarette.

## [Background Art]

As shown in Fig. 1, a conventional filter cigarette comprises a tobacco  
10 rod, a filter rod, and a tipping paper connecting and fixing the filter rod to  
the tobacco rod.

The composition being viewed more closely, in a dual filter composition  
as shown in Fig. 1, two individual wraps 22a and 22b are provided to  
wind two individual filter segments 21a and 21b, respectively, a filter rod  
15 wrap 23 to wind the two filter segments 21a and 21b integrately, and a  
tipping paper 3 to wind and connect the filter rod 2 to a tobacco rod 1  
which comprises a tobacco filler 11 and a tobacco wrap 12 winding the  
tobacco filler 11, thereby a filter cigarette is comprised.

Nowadays, as the bad effect of cigarette smoking is widely known to the  
20 consumer, various methods have been developed toward the  
improvement of not only the quality of the tobacco filler but also the  
function of the filter in order to minimize the bad effect of cigarette  
smoking on a human body.

The filter wraps 22a, 22b and 23 winding the filter rod 2 being referred,  
25 they are made of porous paper or non-woven fabric of outstanding  
ventilation, which, as a medium to induce air to flow in from the outside  
of the filter in order to reduce the constituents of the inhaled smoke,  
serves the purpose of smoothing the ventilation between the ventilation  
holes 31 perforated through laser or other processes on the tipping  
30 paper 3 and the interior of the filter.

A number of the methods for improving the ventilation between the  
ventilation holes 31 and the interior of the filter were introduced; in  
Korea Patent Office Application No. 10-2001-7005178 was disclosed a  
method which used an embossed paper for the filter rod wrap 23, and in

Korea Patent Office Application No. 10-2002-7004931 was disclosed another method which used a corrugated tape for the individual filter wrap 22a to wind the filter segment 21b.

When it comes to the filter material 21, cellulose acetate solutions are most commonly used in the current market, and a method of enlarging the surface area of a filter in order to increase the condensate retention capacity of the filter or of using the cellulose mixed with materials other than acetate, micro-fibril, paper, and non-woven fabric has been developed and adopted for the filter material 21.

Similar fibrous filters made on the cellulose basis have the merit of efficient production process, visual homogeneity of a cross-section of the filter, filterability of nitrosamine and phenol, etc., but they also have a major demerit to be improved: the filtering capacity of a filter is limited and defined by the draw resistance and the physical specifications for the composition of the filter. That is, the filtering capacity of a specified filter (measured by the nicotine and tar retention capacity) is defined by the draw resistance of the filter and the density of the fabric used, and there is no way of maintaining the requirements for a filter's length, diameter, draw resistance, the density of the fabric used, and so on, and, at the same time, increasing the filtering capacity of the filter. As the filtering capacity of a filter increases, so does its draw resistance.

And the size of a filter can not be indefinitely enlarged in order to increase the filtering capacity and the condensate retention capacity of the filter.

As described above, there is a limit in the condensate retention capacity and the particle filtering capacity of the filter material itself.

Therefore, the reliance on the filter material only can not eliminate the noxious substance of cigarette smoke like nicotine, tar, and so on, and the problem still remains, threatening the smoker's health.

As the filter material alone can not eliminate such a limit in the condensate retention capacity and the filtering capacity of a filter, methods of putting various agents into the filter rod 2 have been devised in order to complement such a limit; a process of putting agents in a chamber formed either between the filter segment 21a and 21b or in other position, and a process of putting and dispersing agents inside the filter segment 21b.

The agents so devised that can be used for the filter material 21 cover a variety of minerals, plants, and chemical materials such as carbon powder, silicon dioxide, zeolite, various metals, metallic oxide, green tea powder, aromatics, salt roasted in bamboo, pine resin, artemisia, various  
5 medical herbs, and so on, most of which, except a few like activated carbon powder, are not actually used in the market because of the increase in manufacturing expense, difficulties in improving the product value accordingly to the increase of the manufacturing cost, the uncertainty of the effectiveness, and so on.

10 Even the added carbon powder is just supplementary, not enough to bring about a significant effect for the elimination of noxious substance. Thus, there exist no filter cigarettes in the market safe from the noxious substance from cigarette smoking because of the limit in the filtering capacity of the filter. This is obvious up-to the present.

#### 15 [Description of the Drawings]

Fig. 1 illustrates a view of an anatomy of a conventional filter cigarette at a viewing angle;

Fig. 2 is an attachment drawing of Korea Patent Office U1985-1337 Cigarette Pipe;

20 Fig. 3 is an attachment drawing of Korea Patent Publications PAT1997-8066 Adsorptive Opening for Noxious substance;

Fig. 4(A) illustrates a view of a transparent extraction filter of the present invention at a viewing angle;

(B) illustrates a fragmentary cross-sectional view of the  
25 transparent extraction filter of the present invention;

(C) illustrates a perspective side view of the transparent extraction filter of the present invention;

(D) illustrates a frontal view of the transparent extraction filter of the present invention;

30 Fig. 5 shows the fragmentary cross-sectional views of other actual examples of the transparent extraction filter of the present invention;

Fig. 6(A) illustrates a view of an anatomy of a filter cigarette according to a first embodiment of the present invention at a viewing angle;

Fig. 7 illustrates an enlarged cross-sectional view of the filter cigarette  
35 according to the first embodiment of the present invention;

Fig. 8 shows the enlarged fragmentary cross-sectional views of other actual examples of the filter cigarette according to the first embodiment of the present invention;

Fig. 9(A) illustrates a view of a transparent micro pore extraction filter 5' of the present invention at a viewing angle;

(B) illustrates a fragmentary cross-sectional view of the transparent micro pore extraction filter of the present invention;

(C) illustrates a perspective cross-sectional view of the transparent micro pore extraction filter of the present invention;

(D) illustrates a frontal view of the transparent micro pore extraction filter of the present invention;

Fig. 10(A) illustrates a view of the exterior of the transparent extraction filter cigarette according to the first embodiment of the present invention at a viewing angle;

(B) illustrates a view of the exterior of the transparent micro pore filter cigarette according to the second embodiment of the present invention at a viewing angle; and

(C) illustrates a view of the exterior of a transparent filter cigarette according to the third actual example of the present invention at a viewing angle.

#### \* Explanation of the Reference Codes of the Drawings

1: Tobacco Rod

2: Filter Rod

3: Tipping Paper

4: Transparent Filter Rod Wrap

5: Transparent Extraction Filter for Noxious Substance

6: Partially Transparent Tipping Paper

6a: Opaque Tipping Paper

6b: Transparent Part

21: Filter Material

21a: the First Individual Filter Segment

21b: the Second Individual Filter Segment

22a: the First Individual Filter Wrap

22b: the Second Individual Filter Wrap

23: Filter Rod Wrap

- 31: Ventilation Holes
- 41: Ventilation Windows
- 51: Filter Holders
- 52: Diluted Air Inflow Openings
- 5 53: Smoke Inflow Openings
- 54: Smoke Colliding Walls
- 55: Flow Barriers
- A: Chamber inside the Extraction Filter
- B: Noxious substance
- 10 C: Various Agents

### [Disclosure]

#### [Technical Problem]

From the past, a rather effective way of protecting the smoker's health from hazardous cigarette smoking has been proposed; the use of a cigarette pipe exterior to the cigarette. People have been using a cigarette pipe mainly for convenience or style, but when they clean a cigarette pipe used for a while, not to mention a long smoking pipe, they can see a great deal of the noxious substance or so-called tobacco tar stick to the pipe, which is the result of the cigarette smoke colliding and sticking while going through a long pathway. Imperfect as may be, a cigarette pipe does a rather effective role for filtering in itself.

In Japan PAT617721, Japan Utility Model Publications Sho48-56185, Korea Utility Model Publications U1985-1337 (Fig. 2), and others, was disclosed a cigarette pipe in which is inserted a device that, utilizing the phenomenon of the collision, condensation, liquidation, and adhesion of the cigarette smoke, induces the cigarette smoke to go through a plurality of holes and collide, as described above, thereby enabling to effectively extract tobacco tar, and such cigarette pipes have been produced on a commercial scale and distributed in the market up to the present. The use of a tar eliminating cigarette pipe as such is a very effective way to overcome the limited filtering capacity of a filter cigarette.

However, in spite of the merit of protecting the smoker's health from cigarette smoking by filtering one more time the noxious substance of the smoke which, otherwise, would have been inhaled into the smoker's

body, a cigarette pipe has the demerit of not being widely used for the various negative reasons, such as the troublesome use, the inconvenience of carrying, the rejection of the smell of nicotine, additional expenses, etc..

5 Also, in the past were introduced techniques of inserting into the filter cigarette a device for extracting noxious substance by inducing the cigarette smoke to collide: In Korea Utility Model Publications 72-1150 was disclosed "A Nicotine Eliminating Cigarette Cap Device", in which such a device is inserted between the filter rod and the tobacco rod, and  
10 in Patent Publications PAT1997-8066 (Fig. 3) was disclosed "An Adsorptive Opening for Cigarette Filter" in which a separable upper body [(C) of Fig. 3] with the holes formed therein for the smoke to pass through and a separable lower body [(D) of Fig. 3] with the walls for the smoke to collide against can be joined together. But these two techniques  
15 can hardly be commercially applicable because of numerous problems; the two-body composition's negative effects on the production process and efficiency, the loss of the productivity in inserting the front end and the rear end of the filter as designated, the smoke inflow opening being clogged in case of adopting a charcoal filter, tearing-off of the filter rod  
20 2 at the two dividing lines between the filter segment and the inverted device, and so on.

### [Technical Solution]

The present invention acknowledges that the method of either relying on the filter material or of putting various agents into the filter has an  
25 ultimate limit in the filter cigarette and is, therefore, intended to overcome such a limit fundamentally by a filter device that can effectively extract noxious substance.

Other subject of the present invention is to make feasible in terms of the production process, the manufacturing cost, the function of the filter, and  
30 so on, the formation of such a filter device inside the filter, thereby enabling its commercial application with ease.

Another subject of the present invention is to enhance the product value of the filter cigarette in the filter of which agents are put or a device is inserted for the extraction of noxious substance so that the consumer  
35 can easily recognize such a filter cigarette in the market.

## [Best Mode]

Figs. 4(A), (B), (C), and (D) illustrate a transparent filter for the extraction of noxious substance according to the present invention 5 (hereinafter called extraction filter);

- 5 (A) is a fragmentary view of the extraction filter 5 at a viewing angle;  
(B) is a fragmentary cross-sectional view illustrating the flow of the smoke;  
(C) is a perspective side view;  
(D) is a frontal view.

- 10 A rear view of the extraction filter 5 is identical with the frontal view.  
B indicates a place where noxious substance is deposited. One position only is shown for the simplification of the drawing. The marking of the identical codes is omitted. All drawings attached were drawn in outline  
15 for the sake of understanding. The arrow signs of the drawings indicate the direction of the flow of the smoke, and the arrow signs vertical toward the filter rod 2 indicate the inflow of the outside air from the ventilation holes.

20 From here on, the composition and the resulting function and effect of the present invention will be described in details with reference to the attached drawings.

In a conventional filter device which induces the smoke to collide to extract noxious substance, regardless of whether the filter device is placed in a cigarette pipe or inserted inside a filter, there are two  
25 separated bodies; the upper body where there are a number of the smoke inflow openings 53 and the lower body where there are a number of the smoke colliding walls 54, but, in the extraction filter 5, the smoke inflow openings 53 and the smoke colliding walls 54 are formed in a same body and installed in both the entrance side 53 and 54 and the exit  
30 side 53' and 54' of the smoke.

The monolithic composition in which the smoke inflow openings 53 and the smoke colliding walls 54 constitute the same body as such is a very important factor for a high efficiency of the filter producing process.

Besides, all conventional filter devices have a fixed direction of the

smoke inflow for the compositional reason, therefore, if the insertion of the filter device is reversed, it can no longer work, whereas the extraction filter 5 can extract the noxious substance of the smoke, regardless of whether the smoke flows in through the front end or the rear end of the extraction filter 5.

In a highly automated modern facilities of manufacturing the filter rod 2, it is extremely difficult, though not impossible, to make sure of manually inserting the lower body into the upper body without making errors, especially when both the front and the rear of a filter device are of a shape, therefore, not easily recognizable.

The monolithic composition of the smoke inflow openings 53 and the smoke colliding walls 54 in the same body in order to improve the productivity in manufacturing the filter rods 2, and the arrangement of the smoke inflow openings 53 and the smoke colliding walls 54 in both front and rear of the body constitute an important factor for the present invention, which can never be emphasized too much.

The extraction filter 5, in which the smoke inflow openings 53 and the smoke colliding walls 54 constitute the monolithic body and the insertion of the filter can be either from the front or from the rear of the body, can be manipulated like the filter segments 21a and 21b, and respond to a high speed of the machine rolling up the filter rod wraps 4 to wind each filter segments integrately, even without a separate facilities or a process.

The smoke inflow openings 53 of the extraction filter 5 are of a long, narrow quadrangular shape, and the smoke inflow openings 53 are formed inside around the inner circumference of the extraction filter 5, as shown in Fig. 4(D).

The conventional filter device for extracting noxious substance by the smoke collision has an upper body with a plurality of small holes for the smoke inflow, but there is no reason why the shape of the smoke inflow opening should be circular.

The smoke inflow opening 53 of a quadrangular shape, as shown in Fig. 5 (E), can also induce the smoke inflow to converge and collide, enabling the particles contained in the moisture of the smoke to easily adhere to



the wall against which the smoke collides.

Besides, such quadrangular shape of the smoke inflow opening 53 serves the purpose of the various application of the extraction filter 5 inside the filter rod 2.

- 5 Also, in the present time, most of the filter cigarettes have a dual filter composition, and, in many cases, activated carbon or other agents are added and dispersed, in which case the powders of the agents are likely to clog the smoke inflow holes, causing difficulties in the composition of a cigarette with a filter device inserted. The smoke inflow openings 53 of  
10 a long, narrow quadrangular shape can solve such problem.

Also, such quadrangular smoke inflow openings 53 enable to position the extraction filter 5 in the end of the filter rod 2 toward the tobacco rod 1. Agents or tobacco fillers 11 (if small, it can pass through) can hardly clog or block a whole narrow but long quadrangular smoke inflow opening 53  
15 shaping like a net to filter out the impurities to prevent a gutter from being choked and curving around the circumference of the extraction filter 5. If the said smoke inflow opening 53 is partially clogged or closed, the smoke, without being held up, detours the clogged or closed part of the said smoke inflow opening 53 to pass through.

- 20 Also, such a shape of the smoke inflow opening 53 alleviates draw resistance. If an equal area being installed for the air inflow, the draw resistance of a filter with a number of the smoke inflow openings 53 of a long quadrangular shape is less than that of a filter with a plurality of the small holes.

- 25 Further, as shown in Fig. 4(D), the smoke inflow openings 53 are installed within the ventilation area of the diluted air inflow openings 52 between two neighboring filter holders 51.

The position of the smoke inflow openings 53 as such enables the air flowing in through the diluted air inflow openings 52 to immediately  
30 collide with the smoke inside.

Furthermore, the smoke can pass and collide at the two corners of the smoke inflow openings 53 faster than through the round holes, thereby enhancing the effect of extracting noxious substance.

- 35 To further enhance the extracting effect, another smoke colliding wall 54' is formed, as shown in the circle of Fig. 4(B), so that the smoke may

first collide against the smoke colliding wall 54, and another smoke colliding wall 54 one more time.

The filter holders 51 do not surround the whole filter segments 21a and 21b like a tube, but are separated. In most cases, the filter holder blocks the periphery of the filter disc, causing a problem of being unable to utilize the periphery of the filter disc. The separated filter holders 51 can solve such a problem, and the narrower the area of the filter holders 51 and the less the number of the filter holders 51 is, the better.

Besides, the number of the filter holders 51 differs, as shown in Fig. 4(A) and (D), which means that the extraction filter 5 can have various numbers of the filter holders 51 and the smoke inflow openings 53.

The number and the size can be properly increased or decreased according to the draw resistance, the effect of extracting noxious substance, the efficiency of the production process of winding the filter segments 21a and 21b together, and so on.

The diluted air inflow openings (Ventilation Area) 52 are arranged beside the filter holders 51.

The diluted air inflow openings 52 bring about a new working effect interactively in connection with the ventilation holes 31.

The effect of the ventilation holes 31 is obvious. It guarantees the smoker for the more purified smoke and the reduced amount of smoke inhalation.

On the other hand, the conventional filter device dominantly relying on the ventilation holes has the disadvantage not only of "air taste" but also of the inability to utilize the filtering capacity of the periphery of the filter disc. Recent techniques were devised to enhance the effect of ventilation holes and solve the disadvantage mentioned in the above, but to fail to meet the expectations: Korea Patent Office Application No. 10-2001-7005178 was intended to solve the disproportion of the air inflow ratio between the ventilation holes and the inside filter, but was unable to solve the disadvantage of the ventilation holes mentioned in the above, and Korea Patent Office Application No. 10-2002-7004931 still left the problem of "air taste" unsolved.

The diluted air inflow openings 52 of the extraction filter 5 can bring about a working effect of diluting the smoke by air in connection with the

ventilation holes, thereby solving the disadvantage of the ventilation holes.

Because the smoke flow in parallel with the direction of the fiber, the air flowing in through the ventilation holes mostly fails to mix with the smoke passing through the inside of the filter, flows in its periphery of the filter disc, then is inhaled into the smoker's mouth. Only the amount of the smoke can be reduced but most of the smoke is mixed with air inside the smoker's mouth. As a result, what the consumer call "air taste" causes a loss of the cigarette taste.

On the other hand, the smoke flowing in the periphery of the filter disc, being blocked by the air flowing in through the ventilation holes, brings about a phenomenon of converging toward the center part of the filter, and most of the air inflowing from the outside flow in the periphery of the filter disc, so the filtering capacity of the periphery of the filter disc can not be fully utilized. The periphery of the filter disc that is not utilized for the filtration occupies a significant portion of the whole filter, though the portion varies depending on the position of the ventilation holes to be installed.

In case of the extraction filter 5, the air flowing in through the diluted air inflow openings 52 from the outside collide with the smoke flowing inside the extraction filter in the empty space of the extraction filter 5, which creates a new effect of the smoke being perfectly diluted by the air, thereby solving the disadvantage of the ventilation holes mentioned in the above.

The smoke and the air do not flow separately, but the smoke perfectly diluted by the air pass through evenly.

Therefore, the loss of the cigarette taste due to "air taste" can be eliminated, the disproportion of the air inflow ratio can be corrected, the filtering capacity of the periphery of the filter disc can be utilized, a phenomenon of the inside smoke converging toward the center can be prevented, and the perfectly diluted smoke can stop what the cigarette dealers call "hot collapse", that is, a decrease in the degree of hardness of a filter because of high temperature.

Besides, the diluted air inflow openings 52 can also be installed in the position of (52') of Fig. 4(A), and, accordingly, there are three positions available; the diluted air inflow openings 52 installed toward the entrance

of the smoke, the diluted air inflow openings 52 installed toward the exit of the smoke, and the diluted air inflow openings 52' installed toward the middle. Depending on the choice of a position for the installation of the ventilation holes, filter cigarettes of various flavors (tastes) can be  
5 manufactured.

The flow barriers 55 prevent the exit of the smoke located in the opposite side from being clogged by the extracted noxious substance B. A space is formed where noxious substance stays, stretching after the  
10 direction of the smoke inflow, but the flow barriers 55 block the stretching, therefore it possible to design shorter the entire length of the extraction filter 5.

The flow barriers 55 form a belt following the circumferential direction of the extraction filter 5, but ribs of a fan in case of composing the  
15 extraction filters as shown in Fig. 5 (E).

Fig. 5 shows other actual examples of the extraction 5.

All the drawings are fragmentary cross-sectional views of the cylindrical extraction filter 5 cut in half.

20 Fig. 5(A) illustrates that the smoke colliding wall of the extraction filter 5 of Fig. 4(B) is turned outside, in which case the extracted noxious substance B of Fig. 5 (A) is deposited in the outside of the cylindrical body. Fig. 5(B) illustrates that the place depositing the noxious substance of Fig. 5(A) can be deleted and the entire length of the filter is shortened  
25 thereby. Such a composition enables to design the length of a filter as shortest as possible.

Also, the composition shown in Fig. 5(B) enables to install the smoke inflow openings 53 as shown in Fig. 5(E) (a frontal perspective view illustrating that the smoke inflow openings 53 are installed toward the  
30 center of the circle lengthwise).

In the actual example of Fig. 5(A), the smoke flows in the exterior of the extraction filter, and, therefore, the periphery of the extraction filter disc can be utilized for a ventilation area. In case of Figs. 5(B) and 5(C), the middle area of the extraction filter can also be used for a ventilation area.  
35 Figs. 5(C) and (D) illustrate the Figs. 4(A) and 5(A) cut in half, respectively, in which the smoke flows in one direction only. A diluted air

inflow opening is indicative of the front and rear of the filter, therefore, if a machine or facilities can recognize the diluted air inflow opening and treat the front and rear of the filter properly, the filter cigarette with a shorter length of the extraction filter 5 can be manufactured. All other  
5 actual examples of the extraction filter 5 have the monolithic composition in which the smoke inflow openings 53 and the smoke colliding walls 54 constitute the same body.

The extraction filter 5 suitable for the diameter of any and all of the conventional filter cigarettes (slim type included) can be manufactured,  
10 and there is no problems in properly adjusting within the filter rod 2 all the specifications for each parts and sections of the extraction filter 5 according to the flavor, quality, and design of the filter cigarette to be targeted and produced.

The extraction filter 5 can be made of petrochemical material of a plastic  
15 kind by a refined metallic mold or of highly refined starch easily soluble in water. It is desirable to use material of outstanding solubility in the environment. Therefore, further studies are needed to improve both the cellulose acetate filter hardly soluble in the environment and the extraction filter 5.

20 The extraction filter 5 is made transparent, which, in connection with the important compositional factors of the present invention, generates a new visual effect and economic effect as well.

Fig. 6(A) is a view of an anatomy of a transparent extraction filter  
25 cigarette 10 according to the first embodiment of the present invention at a viewing angle.

In order to show the customer the effect of the extraction filter 5, the present invention adopts a transparent filter rod wrap 4 to wind the filter segments 21a, 21b and the extraction filter 5 integrately, forming a filter  
30 rod 2, and a tipping paper 6, the transparent part of which winds the transparent filter rod wrap 4, to connect the tobacco rod 1 to the filter rod 2, thereby completing a filter cigarette 10 with the extraction filter 5 being inserted in the filter rod 2 and visible to the naked eye.

To conform to the purpose of making the interior of the filter visible,  
35 significantly transparent paper and non-woven fabric or petrochemical materials of films or tapes of a kind, or other materials are good enough

for the material that can be used for the transparent filter rod wrap 4 and the partially transparent tipping paper 6.

To solve the ventilatory problem of the materials other than non-woven fabric, a number of the ventilation windows 41 were installed, the area of which is larger than the area of the ventilation holes 31 and a ventilation window is perforated bigger than a ventilation hole.

The installation of the ventilation holes has prevailed for the conventional filter cigarette so dominantly that such a wrap mentioned in the above seems to be hardly adopted to improve the ventilation, but even if adopted, that is, a filter rod 2, for instance, composed only of the filter segments 21a and 21b is wound by the transparent filter rod wrap 4 on which the ventilation windows 41 of the present invention are formed, the disproportion of the air inflow will occur between the holes of such a place where the air passes straight through the ventilation windows 41, the diluted air inflow openings 52, and the ventilation holes 31 and the holes of the place otherwise. However, such a problem does not occur in the filter cigarette 10 of the present invention because the air ventilates in the empty space of the extraction filter 5.

Being connected interactively with the extraction filter 5 made transparent, the transparent filter rod wrap 4 and the partially transparent tipping paper 6 synergistically bring about an effect of visually differentiating the filter cigarette of the present invention from the others and enhancing its product value.

As shown in 30 of Fig. 10, a filter cigarette, being composed of the partially transparent filter rod 2 which the transparent filter rod wrap 4 and the partially transparent tipping paper 6 constitute, and combined with a filter cigarette which either contains agents or a device effective for the elimination of noxious substance, will certainly enhance the product value of such a filter cigarette.

No matter how effective agents or the device as such may be, if the adoption of the agents or the device can not bring about an increase in the acceptability of the consumer and the resulting economic effect, it is difficult for the invention as such to develop into a commercial product that can reach to the consumer. This is why many antecedent developments of a filter cigarette failed in penetrating into the market, in

spite of its effective agents or device as such.

It is a progressive inventive behavior to cope with prior failure, and make sure of a high productivity and product value from the initial stage of the product development.

- 5 The present invention, being composed of the transparent filter rod wrap 4, the partially transparent tipping paper 6, and the partially transparent filter rod 2, is intended to cope with such prior failures that many filter cigarette developments by the conventional technique had to face in penetrating into the market, and enlarge the acceptability of the  
10 consumer for the filter cigarette.

Seeing the result, the stiff stuff deposited inside of the filter rod, the consumer can actually realize the extracting effect of the noxious substance.

- 15 The visible is to the invisible what a TV is to a radio, and seeing is believing.

Fig. 6(B) shows a transparent filter rod wrap 4. The perforation of the ventilation windows 41 is undertaken by laser or other processes, and  
20 the ventilation windows 41 are formed before the roller is wound by the wraps.

Fig. 6(C) shows a partially transparent tipping paper 6. 6a is an opaque tipping paper, the mouth end segment of the tipping paper 6, and 6b is a transparent part. The opaque tipping paper 6a softens the feeling when  
25 the smoker puts it in the mouth and keeps an esthetic sense, and 6b can be of less transparent color to moderate the rejection of the noxious substance and keep an esthetic sense.

The two slant parallel lines show the joints of 6a and 6b.

Also, as shown in Fig. 6(D), the entire tipping paper 6 is made of  
30 transparent or significantly transparent material.

Fig. 7 is an enlarged fragmentary cross-sectional view of a filter cigarette 10 according to the first actual example of the present invention.

Fig. 8 is an enlarged fragmentary cross-sectional view of other actual  
35 example of the filter cigarette (10) according to the first actual example of the present invention.

Fig. 8 illustrates a composition of a filter cigarette that omits a transparent tipping paper 6. Figs. 8(A), (B), (C), and (D) all show the application of other actual examples of the extraction filter 5. The composition of a filter cigarette, as shown in Figs. 8(A) and (D), enables to manufacture a cigarette of a soft filter, so unique that the part of depositing the noxious substance can be pressed by a finger.

Also, it is possible to compose a filter cigarette omitting the second individual filter section, 21b+22b because of the smoke inflow openings 53 of the extraction filter 5 can keep the entrance from being clogged by the cigarette filler 11.

Further, in case where the extraction filter is composed as shown in Figs. 8(C) and (D), the first individual filter section, 21a+22a can be omitted, and the part of the filter holder 51 of the extraction filter, the mouth end of the filter can be formed flat so that it can be put in the mouth.

Fig. 9 shows a composition of the extraction filter 5' adopting fibrous micro pore.

As described in the above, the extraction filter 5 can be manufactured variously according to the features of the targeted filter cigarette and the size of the filter material.

Fig. 10(A) illustrates a view at a viewing angle of the exterior of a transparent extraction filter cigarette 10 in which is inserted an extraction filter 5 according to the first embodiment of the present invention.

Fig. 10(B) illustrates a view at a viewing angle of the exterior of a transparent micro pore extraction filter cigarette 20 in which is inserted a transparent micro pore extraction filter 5' according to the second embodiment of the present invention.

Fig. 10(C) illustrates a view at a viewing angle of the exterior of a transparent filter cigarette 30 containing in the filter rod 2 various agents visible from the outside according to the third embodiment of the present invention.

In the above, for the explanation's sake, the composition of the present invention and the resultant function and effect were described together.

In summary, the effect of the filter cigarette of the present invention is



clear and diverse.

The composition, in which a number of the smoke inflow openings 53 and a number of the smoke colliding walls 54 of the extraction filter 5 of the present invention constitute a same body and the direction of the  
5 extraction filter 5 is reversible, enables not only for the industry to easily adopt the extraction filter 5 of the present invention, but also to overcome the limit of the nicotine filtering capacity and the condensate retention capacity of the conventional fabric filter, thereby protecting the smoker's health.

10 The noxious substance extracted by the extraction filter 5 in the form of nicotine minus the filtering capacity of the volume of the fibrous filter equivalent to the volume that the extraction filter occupies in the filter rod would have been stick to the smoker's mouth, nasal mucosa, and/or lung.

15 A new effect of diluting the smoke through the diluted air inflow openings 52 of the present invention was described together with the composition of the present invention in the above.

20 The filter cigarette 30 of the present invention, being composed of the filter rod 2 a part of which is transparent, will improve the product value of various chamber filter cigarettes containing effective agents for the extraction of noxious substance, and bring about the economic effect of enlarging the acceptability of the consumer.

25 Also, the present invention enables to manufacture the kind of filter cigarettes which can eliminate various kinds of noxious substance.

For instance, if there is a special kind of noxious substance that can not be extracted by the extraction filter 5, then it is possible to put in the  
30 interior space A of the extraction filter 5 some agents that can filter such kind of noxious substances, and, combining the merit of the chamber filter and that of the instrumental extraction filter, provide the customer with the less harmful filter cigarette.

Further, it is necessary to continue to study ,and ultimately develop the  
35 kind of the enhanced and advanced filter cigarette safe from the lung disease and other diseases.